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Marzio Giglio

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MERCHANT & GOULD PC  
P.O. BOX 2903  
MINNEAPOLIS, MN 55402-0903

EXAMINER

RICHEY, SCOTT M

ART UNIT

PAPER NUMBER

2877

MAIL DATE

DELIVERY MODE

05/04/2010

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/589,514	<b>Applicant(s)</b> GIGLIO ET AL.	
	<b>Examiner</b> Scott M. Richey	<b>Art Unit</b> 2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 16 February 2010.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                    | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Amendment***

The examiner notes that amendments to the claims are not in compliance with 37 C.F.R § 1.121(c). For example, inter alia, currently amended claims 2-4 contain underlining under the invocation of independent claim 1: "Claim1." This invocation, however, was not newly added to the claims. The claims contained this recitation in the amendment filed on 15 August 2006. Further, claim 2 contained the recitation in the original claim. Further, claim 4 includes the underlining, but is indicated as: "PREVIOUSLY PRESENTED."

As a side note, the dependent claims use both capital and lowercase letters when referring to the claims from which they depend. No rhyme or reason is apparent in the mix of conventions, and for the sake of consistency, the applicants might choose one convention or the other.

The reply filed appears to be bona fide, and the issues therein do not appear to be so egregious as to prevent the examiner from addressing the amendments. In the interest of compact prosecution, the examiner is not refusing to enter the amendments as noncompliant, but instead addresses the applicants' reply.

***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 17-25 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The statute sets forth the four classes of invention in the alternative. Therefore, a single claim may not encompass more than one statutory class of invention. Specifically in light of the present claim, a single claim may not be drawn to both an apparatus and a method. Dependent claims 17-25 are clearly set forth as apparatus claims.

17. (CURRENTLY AMENDED) ***Apparatus*** arranged for implementing a measurement ***method*** for determining size and material of particles, ***the method comprising*** the steps of: . . . ; ***the apparatus comprising:*** . . . .

Emphasis added. Independent claim 17 clearly includes both a method and an apparatus. Thus, the claim simultaneously sets forth more than one statutory class of invention within a single claim and is barred by statute.

The examiner noted in the first action that this rejection might easily be overcome by setting forth claim 17 as independent from claim 1. The applicant did this, but then made additional amendments by adding the limitations of claim 1 into claim 17. But, it was precisely the incorporation of the method of claim 1 that ran claim 17 afoul of the statute. Thus, the examiner now notes that this rejection might easily be overcome by

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setting forth claim 17 as independent from claim 1 without incorporating the method of claim 1 or any other method within apparatus claim 17.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 26 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim is drawn to "determining the material" of particles, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

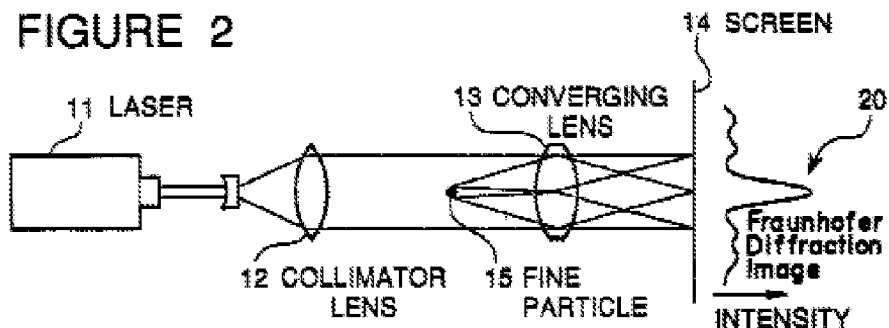
A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-7, 9-18, 20, 21, 23, and 24 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,534,999 ("Koshizuka"). This reference, as each

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reference cited herein, was cited in the Office action and listed on the PTO-892 mailed on 14 August 2009.



As to claim 1, Koshizuka discloses a method of determining the size of particles, as substantially shown in Figure 2, comprising the steps of: generating a beam of radiation which is propagated along a principal direction (11), illuminating with the beam an observation region which is occupied or transited by a plurality of particles (region around 15; system described "to detect fine particles of sub-micron as contaminant in fluid"), a portion of the beam yielding radiation which is scattered by scattering interaction of the portion of the beam with the particles, and another portion being transmitted substantially undisturbed along the principal direction through the observation region (see entire figure), and detecting (14), in a plane disposed on the propagation direction, a plurality of radiation intensity values determined by the interference between the scattered radiation and the transmitted radiation ("Fraunhofer diffraction"), identifying a plurality of interference fringes associated respectively with each individual particle in which the interference pattern is affected by a phase delay of the scattered radiation relative to the transmitted radiation (inherent in the detection of Fraunhofer fringes), the delay being determined by the interaction of the radiation beam

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with said individual particle (inherent within the Fraunhofer diffraction), and determining the size of each particle on the basis of the fringes that are affected by the phase delay.

In column 5, lns.40-45, Koshizuka includes: ". . . while suitable electric signal which represents characteristics (number, size etc) of the particles is produced when any change in intensity caused by the diffraction image of a converged light is appeared in the elements in the photo-detector alley." Emphasis added. While Koshizuka often describes embodiments wherein the measured characteristic is a "number," the reference specifically discloses, in column 5, that the characteristics measured are "number" or "size."

As to claims 2-7, 9, 10, 14, and 15, Koshizuka further discloses the method:

(Claim 2) in which the identification of the plurality of interference fringes comprises a determination of the fractional order at the center relative to each of the plurality of interference fringes associated with each particle ("intensity");

(Claim 3) in which the identification of the plurality of interference fringes comprises a determination of intensity modulation relative to each of the plurality of interference fringes associated with each particle (20);

(Claim 4) in which the radiation beam has a plane wave front (collimated beam);

(Claim 5) in which the detection plane is disposed at a predetermined distance  $z_M$  from the observation region such that the relationship  $z_M > a^2/\lambda$  is valid, where  $\lambda$  is a characteristic value for the wavelength of the radiation used and  $a$  is dimension which is characteristic of the particles contained in the observation region (inherent);

(Claim 6) in which the radiation beam is focused in the vicinity of the observation region (see figure);

(Claim 7) in which the position of the observation region is selected so as to be outside the Rayleigh zone (see figure);

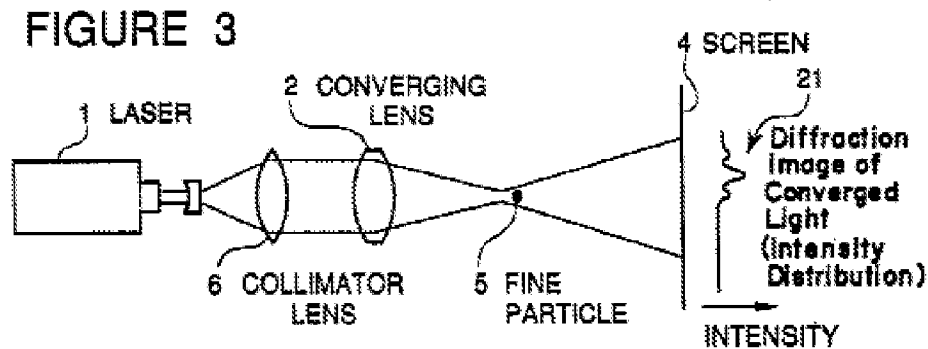
(Claim 9) in which the illumination and the detection are performed from opposite sides of the observation region (11 and 14 are on opposite sides of 15);

(Claim 10) arranged so as to determine the fractional order at the center of the interference fringes produced by a single particle at a time (see figure);

(Claim 14) in which the determination of the interference fringes associated respectively with the particles comprises a determination of the centers of a plurality of interference fringes produced by a corresponding plurality of particles (The detected Fraunhofer diffraction image clearly shows a center of the fringes and clearly shows multiple centers of multiple fringe systems.); and

(Claim 15) in which the determination of the interference fringes associated respectively with the particles comprises a determination of a power spectrum of the electric field corresponding to the plurality of radiation intensity values (power spectrum of E-field implicitly determined as it is a function of intensity, which is clearly shown).

Claims 1, 11-13, and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Koshizuka. Koshizuka discloses a method of measuring properties of particles, as substantially shown in Figure 3, comprising the steps of:



(Claim 1) generating a beam of radiation which is propagated along a principal direction (11), illuminating with the beam an observation region which is occupied or transited by a plurality of particles (region around 15; system described "to detect fine particles of sub-micron as contaminant in fluid"), a portion of the beam yielding radiation which is scattered by scattering interaction of the portion of the beam with the particles, and another portion being transmitted substantially undisturbed along the principal direction through the observation region (see entire figure), and detecting (14), in a plane disposed on the propagation direction, a plurality of radiation intensity values determined by the interference between the scattered radiation and the transmitted radiation ("Fraunhofer diffraction"), identifying a plurality of interference fringes associated respectively with each individual particle in which the interference pattern is affected by a phase delay of the scattered radiation relative to the transmitted radiation (inherent in the detection of Fraunhofer fringes), the delay being determined by the interaction of the radiation beam with said individual particle (inherent within the Fraunhofer diffraction), and determining the size of each particle on the basis of the fringes that are affected by the phase delay. In column 5, lns.40-45, Koshizuka includes: ". . . while suitable electric signal which represents characteristics (number,

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**size** etc) of the particles is produced when any change in intensity caused by the diffraction image of a converged light is appeared in the elements in the photo-detector alley." Emphasis added. While Koshizuka often describes embodiments wherein the measured characteristic is a "number," the reference specifically discloses, in column 5, that the characteristics measured are "number" or "size."

As to claims 11-13 and 16, Koshizuka discloses a method of determining the size of particles, as substantially shown in Figure 2, further comprising the steps of:

(Claim 11) the detection of the plurality of radiation intensity values determined by the interference between the scattered radiation and the transmitted radiation comprises a measurement of the variation of the intensity values over time upon the passage of a particle through the incident beam, the determination of the properties of the particle being based on the variation over time of the fringes that are affected by the phase delay (Figure 9).

(Claim 12) the determination of the properties of the particles presupposes the determination of the position of transit of the particle through the incident beam by analysis of the asymmetry of the variation over time of the intensity values measured (The analysis is based upon an asymmetric diffraction pattern taken as a function of time. The process measures particles. Therefore, the reference is believed to anticipate this claim limitation. For further reasoning, see the rejection under § 112.);

(Claim 13) the measurement of the variation of the intensity values over time takes place by selection of the zone of transit of the particles (The zone of transit is inherently selected by construction of the apparatus.); and

(Claim 16) the determination of the properties of the particles on the basis of the lower-order fringes of the system of fringes is programmed in a manner such as to determine the distribution of the dimensions of the particles (as the "dimensions" are not defined, the existence is construed as being a dimension, and thus, Figure 8 clearly discloses the claim limitations.).

Claim 17 is rejected under 35 U.S.C. § 101 because a single claim may not simultaneously be drawn to two or more statutory classes of invention. Claim 17 is set forth as an "[a]pparatus arranged for implementing a measurement method." Claims depending from claim 17 are each set forth as an "[a]pparatus according to claim . . . ." Clearly, the applicants intended an apparatus claim. In order to apply art, the examiner, in the interest of compact prosecution, construes claim 17 as incorporating apparatus limitations but excluding limitations drawn only to a method.

Koshizuka discloses an apparatus arranged for implementing a measurement method for determining size and material of particles, the apparatus comprising: a source of the radiation beam, suitable for illuminating the observation region (11), sensor means for detecting the radiation at a plurality of points simultaneously and for making available a signal indicative of the detection (14), the sensors being disposed on the propagation axis to detect a plurality of radiation intensity values which are determined by the interference between the scattered radiation and the transmitted radiation, in which the interference is affected by a phase delay of the scattered radiation relative to the transmitted radiation, the delay being determined by the interaction of the radiation beam with the particles (entire figure), and processing means

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which are programmed to determine, on the basis of the signal, interference fringes associated respectively with the individual particles, and to determine the properties of the particles on the basis of the fringes which are affected by the phase delay (image detection is described as "formed by a computer").

As to claims 18, 20, 21, 23, and 24, Koshizuka discloses an apparatus arranged for implementing a measurement method according to claim 1, substantially shown in Figure 2, further comprising:

(Claim 18) lens means interposed between the observation region and the sensor means to permit indirect detection by detection of the plurality of intensity values in an optically conjugate plane (13; The examiner notes that the claim appears to attempt to invoke 35 U.S.C 112, sixth paragraph. The additional recited structure precludes such invocation.);

(Claim 20) further comprising a system for shaping the wave front, suitable for focusing the radiation in the vicinity of the observation region (12; While the collimating system is not disclosed in this embodiment as focusing in the vicinity of the observation region, the lens system is *suitable* for focusing.);

(Claim 21) further comprising a system for shaping the wave front, suitable for collimating the radiation that is incident on the observation region (12 or 13, both are suitable for collimating radiation incident on the observation region);

(Claim 23) the sensor means comprise a plurality of photodiodes arranged in manner such as to detect, as a function of time, the intensity distribution produced by

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the interference between transmitted radiation and scattered radiation ("photo-diode alley"); and

(Claim 24) the photodiodes are arranged in a manner such as to pick up selectively radiation coming from predetermined zones of transit of the particles (positioned at 14).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 8, 19, 22, and 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koshizuka.

Koshizuka teaches all the claimed elements except for: describing the lenses as cylindrical lenses; utilizing a CCD, NMOS, or CMOS; and utilizing a multi-colored source. Each of these elements is well known. See for example, U.S. Patent 4,429,995, where cylindrical lenses are used to create a blade ("fan") of light across a fluid flow to detect particle sizes. See for example U.S. Patent 6,411,406, where a CCD detector is utilized to measure wavefront aberrations in the measurement of particles, and various wavelength bands are utilized. As to measurements of shape and material, the applicants do not point to any inventive feature that makes their invention capable of determining more information than is achievable in the prior art. The applicants rightly point out that changes in the particle impart changes in the shape of the detected diffraction image, as is well known. Either further determination based on the changed, capture, and detected image, would be any one of a myriad of further determinations - such as the taught number and size - that one of ordinary skill would at least have tried because an increase in information about a system under test is beneficial per se.

It would have been obvious to one of ordinary skill in the art at the time of invention to choose cylindrical lenses for the disclosed optics, to choose a solid-state chip for the detector, to utilize a multi-colored light source, and to measure shape and material of the particle as it has been held that combining known elements within a known invention to achieve predicted results is within the purview of one possessing ordinary skill, basic creativity, and common sense.

### ***Response to Arguments***

The applicants provide only one argument in their response filed on 16 February 2010. While the argument has been fully considered, it is not persuasive. The applicants' argument is an "assert[ion] that Koshizuka does not disclose or suggest a method that determines the size of particles. Koshizuka only discloses a system that detects the existence of a number of particles."

Even if this applicants' assertion was true, the apparatus claims would be anticipated because the applicants have not disclosed any structural detail beyond those disclosed by Koshizuka. Therefore, the argument is entirely insufficient to address the apparatus claims.

The applicants' assertion is false. In column 5, lns.40-45, Koshizuka includes: ". . . while suitable electric signal which represents characteristics (number, size etc) of the particles is produced when any change in intensity caused by the diffraction image of a converged light is appeared in the elements in the photo-detector alley." Emphasis added. While Koshizuka often describes embodiments as measuring a "number," the reference specifically discloses that the characteristics measured are "number" or "size."

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Several facts have been relied upon from the personal knowledge of the examiner about which the examiner took Official Notice in the previous Office Action mailed on 14 August 2009. The applicant must seasonably challenge well known statements and statements based on personal knowledge. See MPEP 2144.03; *In re Selmi*, 156 F.2d 96, 70 USPQ 197 (CCPA 1946); *In re Fischer*, 125 F.2d 725, 52 USPQ 473 (CCPA 1942); and *In re Boon*, 439 F.2d 724, 169 USPQ 231 (CCPA 1971).

A challenge to the taking of judicial notice must contain adequate information or argument to create on its face a reasonable doubt regarding the circumstances justifying the judicial notice. To adequately traverse such a finding, an applicant must specifically point out the supposed errors in the examiner's action, which would include stating why the noticed fact is not considered to be common knowledge or well-known in the art, a general allegation that the claims define a patentable invention being inadequate.

A seasonable challenge constitutes a challenge made as soon as practicable during prosecution. Thus, the applicant is charged with rebutting the well-known statement in the next reply after the Office action in which the well-known statement was made. If the applicant does not seasonably traverse the well-known statement during examination, then the object of the well-known statement is taken to be admitted prior art.

The applicant has not presented a traversal in the Amendment filed on 16 February 2010, thus the well-known statement is taken to be admitted prior art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott M. Richey whose telephone number is (571) 270-1296. The examiner can normally be reached on Monday - Thursday, 10:00 - 17:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Toatley can be reached on (571) 272-2059. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Scott M. Richey  
Patent Examiner  
Art Unit 2877

/Gregory J. Toatley, Jr./  
Supervisory Patent Examiner,  
Art Unit 2877  
3 May 2010